

Serial No.: 09/742,127
Atty. Docket No.: P66182US0

REMARKS

By this Amendment, Applicant has canceled claims 1-5, 7, 9-16 and 19-25, and amended claims 8 and 17. Claims 8 and 17 are pending in the application. In view of the above amendments and the following remarks, favorable reconsideration in this application is respectfully requested.

The Examiner rejected claims 1-3 and 7 under 35 U.S.C. 103(a) as being unpatentable over WO 00/12786 to Tamatsuka, translated as U.S. Patent No. 6,413,310. The Examiner also rejected claim 4 as being unpatentable over Tamatsuka in view of U.S. Patent No. 5,352,615 to Limb et al. ("Limb"), claim 5 as being unpatentable over U.S. Patent No. 4,376,657 to Nagasawa et al. ("Nagasawa") in view of U.S. Patent No. 4,429,047 to Jastrzebski et al. along with U.S. Patent No. 5,882,989 to Falster, claims 17-19 as being unpatentable over U.S. Patent No. 5,968,264 to Iida et al. ("Iida") in view of U.S. Patent No. 4,193,783 to Matsushita, and claim 8 as being unpatentable over Iida in view of Matsushita and further in view of Nagasawa.

As set forth in amended claim 8, the present invention is directed to a method of producing a semiconductor wafer including the production of a single crystalline semiconductor ingot with a large vacancy-rich region which is formed by moving the OiSF ring from the center of a single crystalline semiconductor growth axis to the circumference to extend a first area and a second area, constituting part of the large vacancy-rich region in which it is easy to produce bulk micro-defects of high density, and in which $\Delta(O_i)$, as an oxygen concentration difference between initial oxygen concentration and oxygen concentration after heat treatment in N_2 ambience

Serial No.: 09/742,127
Atty. Docket No.: P66182US0

at 1000 °C for 64 hours, is increased more than other areas, the first and second areas covering all of the wafer except the circumference, as supported in the specification at page 12, lines 16-18.

As set forth in amended claim 17, the present invention is also directed to a method of growing an ingot in which an OiSF ring is formed at the circumferential part by moving the OiSF ring from the center of a single crystalline semiconductor growth axis to the circumference in order to extend the large vacancy-rich region in which bulk micro-defects may be produced easily. Within this vacancy-rich region, the delta (Oi) is increased as compared to that of other areas, with the delta (Oi) being a difference between an initial oxygen concentration and oxygen concentration after heat treatment with a thermal history which is carried out at 1000°C for 64 hours in a N₂ ambience. The resulting vacancy-rich region occupies from 20 to 90% of the ingot's diameter.

Neither of these claims is fairly shown or suggested by Iida which, rather than generating a vacancy-rich region, is instead directed to producing a neutral region. Nor is there anything in Matsushita, which deals with producing lattice strains through heating during ingot production, which suggests formation of a vacancy-rich region such as that claimed by the present invention. Finally, Nagasawa deals only with heat treatment and does not teach or suggest moving the OiSF ring from the center to the circumference to produce a large vacancy-rich region in which bulk micro-defects may be produced easily and that covers most of the wafer.

Serial No.: 09/742,127
Atty. Docket No.: P66182US0

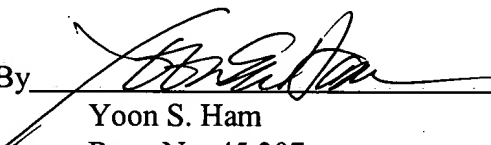
For at least the foregoing reasons, claims 8 and 17 are neither taught nor suggested by the prior art, but are patentable thereover. Favorable reconsideration is requested.

By this Amendment, Applicant has incorporated into claims 8 and 17 subject matter already considered by the Examiner and noted as not having been included in the claims. All other previously pending claims have been canceled. Accordingly, Applicant presents this Amendment as not raising new issues and therefore being proper after Final Action. Entry of the amendment and allowance of claims 8 and 17 is requested.

Should the Examiner have any questions or comments, the Examiner is cordially invited to telephone the undersigned attorney so that the present application can receive an early Notice of Allowance.

Respectfully submitted,

JACOBSON HOLMAN PLLC

By 
Yoon S. Ham
Reg. No. 45,307

400 Seventh Street, N.W.
Washington, D.C. 20004
Telephone: (202) 638-6666
Date: October 22, 2003